

REMARKS

Reconsideration and allowance are respectfully requested in light of the above amendments and the following remarks.

Applicant acknowledges with appreciation the indication in the Office Action of allowable subject matter in claim 7.

Claims 1-21 have been cancelled in favor of new claims 22-43, which better define the subject matter Applicant regards as the invention. Support for the new claims is provided in the original claims and Figs. 3B, 4, and 11 and their accompanying descriptions in the specification. The new claims have been drafted to avoid the issue underlying the objection to claim 5.

Claims 1-6, 8, 9, and 12-21 were rejected, under 35 USC §102(e), as being anticipated by Seki et al. (US 5,771,224). Claims 10 and 11 were rejected, under 35 USC §103(a), as being unpatentable over Seki in view of Vook et al. (US 5,982,327). To the extent these rejections are deemed applicable to new claims 22-43, Applicant respectfully traverses.

New claim 22 is a revised version of the subject matter defining cancelled claim 1 and recites:

*An OFDM transmission apparatus providing a transmission period in which communication control information and user data are transmitted at the same time using a plurality of subcarriers forming an OFDM signal, said OFDM transmission apparatus comprising:
an OFDM signal former that allocates: (i) the same communication control information to each of specific*

subcarriers of the OFDM signal and (ii) the user data to subcarriers of the OFDM signal other than said specific subcarriers; and

a transmitter that transmits the OFDM signal formed in the OFDM signal former.

The office cites Seki's Figs. 2 and 3 in the anticipation rejection of claim 1. However, Seki fails to disclose the features recited in claim 22 of: (1) providing a transmission period in which communication control information and user data are transmitted at the same time using a plurality of subcarriers forming an OFDM signal and (2) allocating: (a) the same communication control information to each of specific subcarriers of the OFDM signal and (b) the user data to subcarriers of the OFDM signal other than said specific subcarriers.

By contrast to the claimed features, Seki discloses in Fig. 2 a transmission frame format in which each of the n carriers of an OFDM signal transmits a null symbol in the first time slot and a reference symbol in the second time slot (Seki col. 7, lines 22-26 and 33-38). The null and reference symbols are used for timing synchronization so that the receiver recognizes the frame and the phase and amplitude of each carrier (col. 7, lines 38-42). In all other time slots, only QAM and QPSK information symbols are transmitted by the n carriers (col. 7, lines 43-46). These features are identified by the legends appearing in Fig. 2 at the top-left and bottom-center portions of the illustration.

Seki does not disclose any other type of information in Figs. 2 and 3. Simply put, Seki discloses that for each of the M symbol time slots a single type of information, either communication control information or user information, is assigned to every carrier of the OFDM signal. Therefore, Seki does not disclose the feature recited in claim 22 of providing a transmission period in which communication control information and user data are transmitted at the same time using a plurality of subcarriers forming an OFDM signal.

Since Seki does not disclose transmitting both communication control information and user data at the same time on separate carriers of an OFDM signal, it necessarily follows that Seki cannot disclose the more specific feature recited in claim 22 of allocating for the same transmission period: (a) the same communication control information to each of specific subcarriers of the OFDM signal and (b) the user data to subcarriers of the OFDM signal other than said specific subcarriers.

Accordingly, Applicant respectfully submits that Seki does not anticipate the subject matter defined by claim 22. Therefore, allowance of claim 22 and all claims dependent therefrom is warranted.

Independent claim 39 recites the features discussed above distinguishing apparatus claim 22 from Seki, but with respect to

a method. For similar reasons that these features distinguish claim 22 from Seki, so too do they distinguish claim 39. Therefore, allowance of claim 39 and all claims dependent therefrom is warranted.

New claim 27 is a revised version of the subject matter defining cancelled claim 4 and recites:

An OFDM reception apparatus comprising:
a receiver that receives an OFDM signal formed by a plurality of subcarriers that are communicated at the same time, wherein: (i) the same communication control information is allocated to each of specific subcarriers of the OFDM signal and (ii) user data is allocated to subcarriers of the OFDM signal other than said specific subcarriers;
an extractor that extracts the communication control information from one of the specific subcarriers of the received OFDM signal; and
a determiner that determines, based on reception levels of the specific subcarriers, from which specific subcarrier the communication control information is extracted for use in communication control.

The office action applies Seki in the anticipation rejection of claim 4. However, Seki fails to disclose the features recited in claim 27 of: (1) a receiver that receives an OFDM signal formed by a plurality of subcarriers that are communicated at the same time, wherein: (a) the same communication control information is allocated to each of specific subcarriers of the OFDM signal and (b) user data is allocated to subcarriers of the OFDM signal other than said specific subcarriers and (2) a determiner that determines, based on reception levels of the

specific subcarriers, from which specific subcarrier the communication control information is extracted for use in communication control.

The Office Action proposes that Seki's Fig. 4 anticipates the receiver defined by cancelled claim 4 (Office Action page 3, first paragraph). However, Seki discloses that Fig. 4 illustrates a receiver adapted for the OFDM transmission system according to the first embodiment of the invention (Seki col. 5, lines 46-48). Additionally, Seki discloses that Fig. 2 illustrates the transmission frame format of the OFDM transmission system of the first embodiment and Fig. 3 illustrates a transmitter adapted for the OFDM transmission system of the first embodiment (col. 5, lines 40-45). In short, Seki's transmitter and receiver communicate using the transmission frame format of the OFDM transmission system disclosed in the first embodiment.

The format of the OFDM signal received by the receiver defined by claim 27 is similar to that transmitted by the transmitter defined by claim 22. The above-provided discussion distinguishing claim 22 from Seki describes why Seki does not disclose a transmitter that generates and transmits the type of OFDM signal recited in claims 22 and 27. This discussion is incorporated by reference here, for brevity. Since Seki's

transmitter does not transmit the OFDM signal format recited in claim 22, it necessarily follows that Seki's receiver cannot receive this OFDM signal format. This result necessarily obtains because Seki expressly discloses that the receiver of Fig. 4 is adapted to receive the transmission frame format illustrated by Fig. 2 and that the transmitter of Fig. 3 is adapted to transmit this transmission frame format in accordance with the OFDM transmission system of the first embodiment. Therefore, Seki does not disclose a receiver that receives an OFDM signal formed by a plurality of subcarriers that are communicated at the same time, wherein: (a) the same communication control information is allocated to each of specific subcarriers of the OFDM signal and (b) user data is allocated to subcarriers of the OFDM signal other than said specific subcarriers, as recited in claim 27.

The Office Action proposes that Seki discloses a determiner that determines, based on reception levels of specific subcarriers, from which specific subcarrier communication control information is extracted for use in communication control (Office Action page 3, lines 5-8). Continuing, the Office Action proposes that Seki discloses this feature in the following way. Seki's reference symbol detector 28 compares a received reference symbol with a comparison reference symbol generated by a reference symbol generator 29 to detect an amplitude error and a

phase error of each carrier (see Office Action page 3, lines 8-10, and Seki col. 9, line 66, through col. 10, line 4). However, this portion of Seki's disclosure merely states that a reference symbol received on each carrier of a multicarrier signal is compared to a version of this symbol that has not been distorted by propagation effects so as to determine how the propagation effects have changed the phase and amplitude of the received reference symbol. No comparison of reception levels between two carriers is performed and no selection is made based on such a comparison, as required by claim 27.

Continuing, again, the Office Action proposes that Seki discloses that the phase and amplitude errors are sent to a QPSK symbol error detector 32 for use in detecting amplitude and phase offsets of subsequently received QPSK information symbols (see Office Action page 3, lines 10-12, and Seki col. 10, lines 12-17). However, this passage also does not disclose comparing reception levels of two carriers or selecting a carrier from which control information will be extracted, as required by claim 27.

Finally, the Office Action proposes that Seki discloses a correction circuit 30 that corrects amplitude and phase errors of the received information symbols using the phase offsets detected by QPSK symbol error detector 32 (see Office Action page 3, lines

12-13, and Seki col. 10, lines 28-34). Here too, an examination of this passage makes clear that Seki does not disclose comparing reception levels of two carriers or selecting a carrier from which control information will be extracted, as required by claim 27.

In accordance with the above discussion, Applicant submits that Seki does not anticipate the subject matter defined by claim 27 of: (1) a receiver that receives an OFDM signal formed by a plurality of subcarriers that are communicated at the same time, wherein: (a) the same communication control information is allocated to each of specific subcarriers of the OFDM signal and (b) user data is allocated to subcarriers of the OFDM signal other than said specific subcarriers and (2) a determiner that determines, based on reception levels of the specific subcarriers, from which specific subcarrier the communication control information is extracted for use in communication control. Therefore, allowance of claim 27 and all claims dependent therefrom is warranted.

Independent claim 42 recites the features discussed above distinguishing apparatus claim 27 from Seki, but with respect to a method. For similar reasons that these features distinguish claim 27 from Seki, so too do they distinguish claim 42.

Therefore, allowance of claim 42 and dependent claim 43 is warranted.

Independent claim 34 recites:

*An OFDM reception apparatus comprising:
a receiver that receives an OFDM signal formed by a plurality of subcarriers that are communicated at the same time, wherein: (i) the same communication control information is allocated to each of a first subcarrier of angular frequency 0 and a second subcarrier different from said first subcarrier, within the OFDM signal and (ii) user data is allocated to subcarriers of the OFDM signal other than said first and second subcarriers;*

*an extractor that extracts the communication control information from one or both of the first and second subcarriers of the received OFDM signal; and
a determiner that determines how the communication control information will be extracted from the first and second subcarriers based on their respective reception qualities.*

Seki fails to disclose the features recited in claim 34 of:

(1) a receiver that receives the claimed OFDM signal format and
(2) a determiner that determines how communication control information will be extracted from first and second subcarriers based on their respective reception qualities. Feature (1), immediately above, is identical to one of the features discussed above for distinguishing claim 27 from Seki. This discussion is incorporated here by reference for distinguishing claim 34 from Seki, based on the same reasoning applied in distinguishing claim 27 from Seki.

Moreover, Seki does not disclose a determiner that determines how communication control information will be extracted from first and second subcarriers based on their respective reception qualities. The features disclosed by Seki that the Office Action identified as anticipating the determiner of cancelled claim 4 are discussed above in connection with claim 27. This discussion is incorporated here by reference to show that Seki discloses detecting phase and amplitude errors of received reference symbols for use in correcting the phase and amplitude errors of later-received information symbols. Seki does not disclose determining how the same communication control information will be extracted from first and second subcarriers based on their respective reception qualities.

Accordingly, Applicant submits that Seki does not anticipate the subject matter of claim 34. More specifically, Seki does not disclose the features recited in claim 34 of: (1) a receiver that receives an OFDM signal formed by a plurality of subcarriers that are communicated at the same time, wherein: (a) the same communication control information is allocated to each of specific subcarriers of the OFDM signal and (b) user data is allocated to subcarriers of the OFDM signal other than said specific subcarriers and (2) a determiner that determines how communication control information will be extracted from first

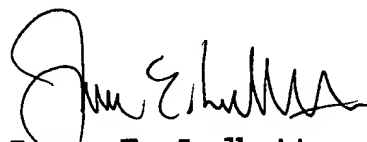
and second subcarriers based on their respective reception qualities. Therefore, allowance of claim 34 and all claims dependent therefrom is warranted.

Vook was applied by the Office Action in the rejection of cancelled claims 10 and 11 for the teaching of applying weighting processing to received symbol information (see Office Action page 5, third paragraph). The pending independent claims do not recite symbol weighting processing, and, therefore, Vook's teaching is inapplicable to these claims.

In view of the above, it is submitted that this application is in condition for allowance and a notice to that effect is respectfully solicited.

If any issues remain which may best be resolved through a telephone communication, the Examiner is requested to telephone the undersigned at the local Washington, D.C. telephone number listed below.

Respectfully submitted,



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Date: October 22, 2004
JEL/DWW/att

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